Tamarin Polyspecific Associations: Forest Utilization and Stability of Mixed-species Groups

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ABSTRACT. Niche separation is likely to play a key role in the formation of mixed-species groups. Saddle-backed tamarins (Saguinus fuscicollis) were studied at three sites with different primate communities in northern Bolivia: (1) with red-bellied tamarins, S. labiatus; (2) with emperor tamarins, S. imperator; and (3) without a congeneric species. The degree of association is higher between S. labiatus and S. fuscicollis than between S. imperator and S. fuscicollis and is related to differences in forest utilization between associating pairs. Niche separation is found to be greater between S. labiatus and S. fuscicollis than between S. fuscicollis and S. imperator. The mean height and habitat utilization of S. fuscicollis does not differ greatly across the three sites, nor does the height of tamarins in and out of association (9). It is concluded that combined with differences in body size and dietary overlap, vertical segregation plays an important role in tamarin polyspecific associations (increasing the potential of both foraging and anti-predatory benefits) and that this is not a consequence of vertical displacement of S. fuscicollis by its dominant congeners.

Key Words: Saguinus fuscicollis; S. mystax; S. labiatus; S. imperator; Vertical stratification; Competition.

INTRODUCTION

It is of particular interest to examine niche partitioning between species which form stable mixed-species groups to examine how resources are partitioned and how this affects the stability of such groups. According to accepted ecological theory, whenever two closely related species with strongly similar ecological requirements occur sympatrically, they enter into interspecific competition which drives one of the two species to local extinction or leads to character displacement (SCHOFNER, 1988; KEDDY, 1989). Following this, most investigations of multispecies primate communities have focussed on niche partitioning between sympatric species and body size appears to be a critical factor in structuring communities, for it constrains diet, foraging techniques, and strategies against predators (e.g. CHARLES-DOMINIQUE, 1977; GAUTIER-HION, 1978; MACKINNON & MACKINNON, 1978; STRUHSAKER, 1978; TERBORGH, 1983).

Tamarins (Saguinus sp.) are excellent study animals to address questions concerning the relationship between niche partitioning and polyspecific associations. Saddle-backed tamarins (Saguinus fuscicollis) associate with three other tamarin species in different parts of their geographical distribution: the moustached tamarin, S. mystax (e.g. HEYMANN, 1990; PERES, 1992), the red-bellied tamarin, S. labiatus (e.g. POOK & POOK, 1982; BUCHANAN-SMITH, 1990) and the emperor tamarin, S. imperator (TERBORGH, 1983; WINDFELDER, 1997). Whilst the polyspecific association between S. fuscicollis and S. mystax, and S. fuscicollis' association with S. labiatus are well documented, data are not always directly comparable and, until now there has been a lack of quantitative data for S. imperator whose association with S. fuscicollis has only previously been described at one study site, Cocha Cashu, Manu National Park in Peru (TERBORGH, 1983; WINDFELDER, 1997).
The present study provides directly comparable data on two of the tamarin associations, from new study sites. The specific aims of this paper are (1) to compare forest utilization of associating tamarins to examine its relationship with association patterns and (2) to compare the forest utilization of tamarins in single- and mixed-species groups to determine whether association alters it. For example, if associating tamarins are in competition, I would predict a shift in ecological niche from being in association for *S. fuscicollis*, as they are subordinate to their congeners, but no such shift for the dominant congeners.

**METHODS**

**STUDY SITES AND PRIMATE COMMUNITIES**

The study was conducted in the Pando Department of northern Bolivia (Fig. 1) from June—October 1997. This coincides with the dry season (Buchanan-Smith, 1991). I made observations at five sites north of the Rio Tahuamanu and at other sites south of the Rio Tahuamanu close to the Rio Muyumanu. The distribution of three primates is restricted to the north of the Rio Tahuamanu: the red-bellied tamarin (*S. i. labiatus*), Gray's bald faced saki (*Pithecia irrorata*), and goeldi's monkey (*Callimico goeldii*). The emperor tamarin (*S. imperator subgrisescens*) only occurs south of the Rio Tahuamanu in seasonally flooded forest along the banks of the Rio Muyumanu and its tributaries. Nine other primate species occur throughout the Pando Department: saddle-backed tamarins (*S. fuscicollis weddelli*), pygmy marmosets (*Cebuella pygmaea*), brown titi monkeys (*Callicebus brunneus*), two species of capuchins (*Cebus apella* and *C. albifrons*), squirrel monkeys (*Saimiri boliviensis*), night monkeys (*Aotus nigriceps*), Bolivian red howling monkeys (*Alouatta sara*), and black-faced black spider monkeys (*Ateles chamek*) (taxonomy after Rylands et al., 1995).

For the purposes of this paper three sites are compared: Site 1: all five study areas north of

![Fig. 1. Sketch map of the Pando Department of northern Bolivia with study sites marked (●).](image-url)